THE GEOLOGY OF

SEBAGO LAKE STATE PARK

By ARTHUR L. BLOOM
Maine Geological Survey
Department of Economic Development

Augusta, Maine 1959

MAINE GEOLOGICAL SURVEY

Robert G. Doyle, *State Geologist*

THE GEOLOGY OF SEBAGO LAKE STATE PARK

By

ARTHUR L. BLOOM

Department of Geology

Yale University

New Haven, Connecticut

State Park Geologic Series #1

Department of Economic Development

Augusta, Maine

November 1, 1959

The Maine Geological Survey in cooperation with the State Park Commission is publishing the first of a series of state park geologic reports – THE GEOLOGY OF SEBAGO LAKE STATE PARK. This report, written in semipopular style, describes the geology of the State Park area and vicinity. Special emphasis has been placed on the interesting surface features that were developed by the glaciers which once covered the entire state.

These reports are planned for use by tourists and campers who visit the State Parks, but may be of general interest to anyone who desires some knowledge of the geology of the State.

TABLE OF CONTENTS AND ILLUSTRATIONS

Page

Contents

Illustrations

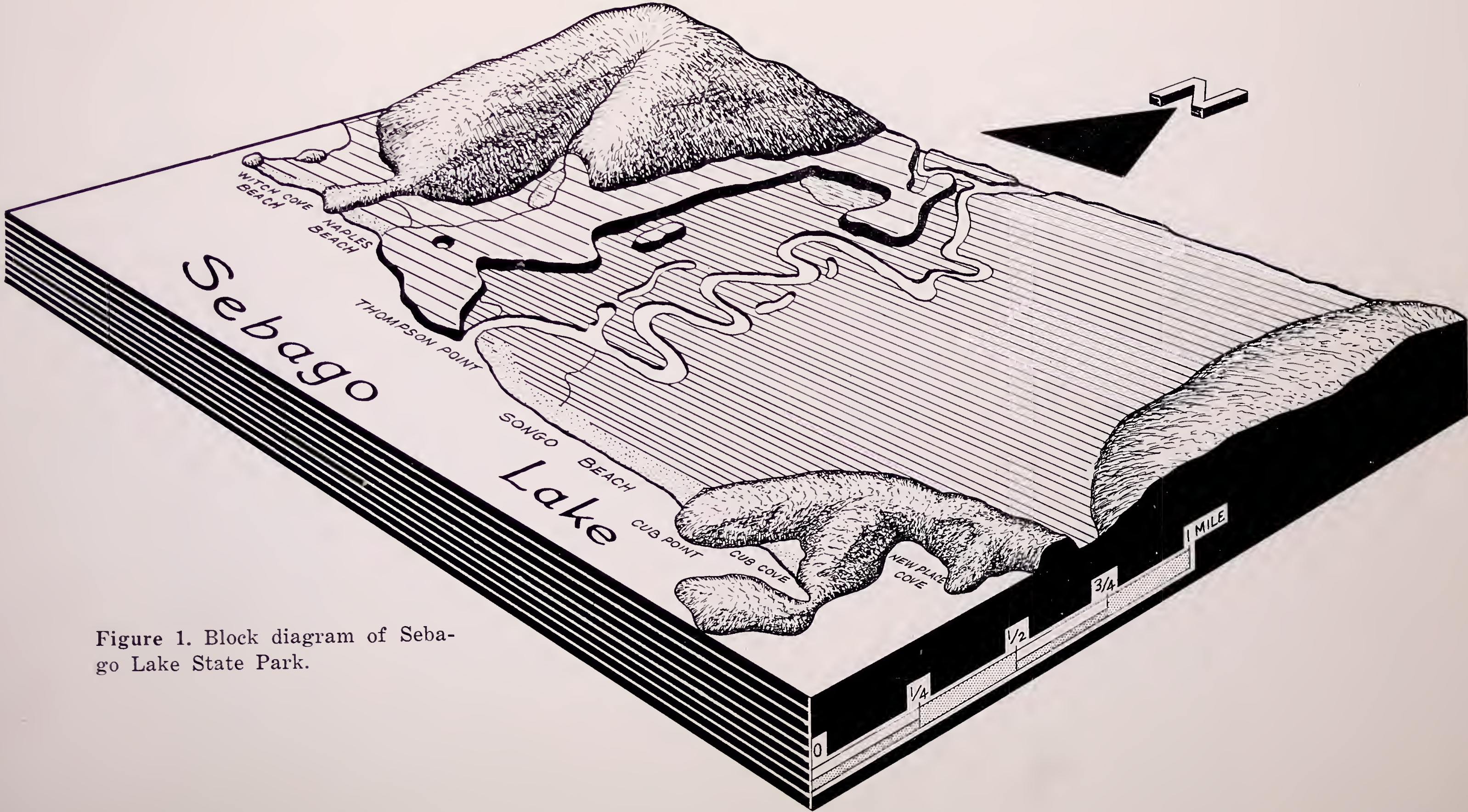


Figure 1. Block diagram of Sebago Lake State Park.

GEOLOGY OF THE SEBAGO LAKE STATE PARK AREA, MAINE

by

Arthur L. Bloom

INTRODUCTION

This pamphlet has been prepared for the use of tourists and campers who are interested in learning the origin of the scenery around them. The finest appreciation of scenic beauty comes through understanding how the landscape took its present form, and there is no better opportunity to gain some understanding of Earth history than when the evidence is available at every glance. Sebago Lake State Park is not a place of awe-inspiring mountains or canyons, but within its limits there is abundant evidence of a fascinating history. We hope that by reading this pamphlet and visiting the places described, you will begin to see how geologists are able to interpret Earth history, and we further hope that some of the principles of interpretation illustrated here will be useful to you as you travel through other regions.

Sebago Lake lies on the boundary between two geographic regions. Southeast of the lake is a coastal plain about 15 miles wide, with many low rocky ridges separated by broad valleys. The relief (the difference in altitude between valley floors and adjacent hill tops) on the coastal plain is generally less than 300 feet. Northwest of the lake is a rugged upland region in which the maximum relief increases toward the northwest from about 1000 feet near Sebago Lake to more than 4000 feet in the heart of the White Mountains. Mount Washington, the highest peak in northeastern United States (6,288 feet) is just 44 airline miles northwest of Sebago Lake State Park.

Sebago Lake has a surface area of 44.8 square miles, and is the second largest lake in the State of Maine, exceeded only by Moosehead Lake. The surface of the lake is normally at an altitude of slightly more than 270 feet above sea level, although the surface level varies according to the amount of annual precipitation. The lake has a maximum depth of 316 feet, at a point about 4 miles south of the State Park. It is interesting to note that the deepest part of the lake is actually more than 40 feet below sea level.

Sebago Lake State Park occupies an area of 1296 acres at the northern end of the lake, divided into two nearly-equal halves by the Songo River. Most of the sandy plains in the park lie less than 30 feet above lake level, but scattered rocky hills are somewhat higher. The highest point in the State Park is the crest of a hill on the western boundary of the park at an altitude of 499 feet. A trail leads to this hill top from the camp-ground road.

GEOLOGIC HISTORY

The surface features of Sebago Lake State Park have been shaped by events of the recent geologic past covering only about the last 20,000 years, but the bedrock (the solid rock that underlies soil, sand, gravel, etc.) of the region is very old. The most abundant type of bedrock in the State Park is light-colored granite. Granite is composed of interlocking grains of the minerals quartz, feldspar and mica. Streaked through the granite are veins of rock that have a mineral composition similar to granite, but have grains that are much larger. This coarse-grained rock is called pegmatite.

The granite and pegmatite are 200-500 million years old. They were formed deep within the crust of the Earth, during the Paleozoic era (Figure 2) under temperature and pressure sufficiently high to partially melt and liquify older rocks. At a later date, perhaps 165-200 million years ago, during the Triassic period, the hardened granite and pegmatite were broken and hot, molten rock squeezed into available openings and cooled to form cross-cutting layers called dikes. The dike rock is quite unlike granite and pegmatite. It is black, and so fine-textured that individual mineral grains can barely be seen without magnification, but sparkle like lump sugar. The black dike rock is of several varieties, but most of it is a rock called dolerite. Some of this molten rock reached the surface of the ground in central Massachusetts and Connecticut and also in Nova Scotia during the Triassic period, and flowed out of volcanoes as lava. No volcanic rocks of the Triassic period are known from Maine, but they may have existed and now have been eroded away.

Following the period of dolerite intrusion Maine, as well as the rest of New England, entered a long period of uneventful, slow erosion. Little by little, grain by grain, rivers carved away the rocks, cut valleys, and gradually reduced mountain ranges to low hills. By 70-130 million years ago, in the Cretaceous period, the present outline of

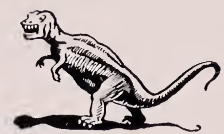
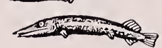
Eras	Periods or Epochs	Age (millions of) (years ago)	Characteristic Form of Life		Major Geologic Events	Geologic Record in Sebago Lake State Park
CENOZOIC	Pleistocene	1	man		World wide glaciation	Sculpturing of bedrock and deposition of glacial material in the State Park area
	Pliocene Miocene Oligocene Eocene Paleocene	12 25 35 60 70	primitive mammals		Alps, Himalayas	Final up-arching of the New England Upland
MESOZOIC	Cretaceous	150	Dinosaurs: first flowering plants		Rocky Mountains	
	Jurassic	165	first birds		Sierra Nevada	
	Triassic	200			Palisades, N. J. Conn. Valley	Intrustion of dark colored dike rocks?
PALEOZOIC	Permian	235	reptiles		Appalachian Mountains	
	Pennsylvanian	260	coal forests			
	Mississippian	285	amphibians			
	Devonian	325	land plants, fish			Formation of light colored granite bedrock
	Silurian Ordovician Cambrian	350 410 500	marine invertebrates			
Pre-Cambrian Eras		3,000?			Origin of Earth	

Figure 2. Scale of Geologic Time. The subdivisions of the Paleozoic and Mesozoic eras are called periods, the somewhat shorter subdivisions of the Cenozoic era are called epochs.

eastern North America was taking shape. Only the eroded stumps of former mountains remained, rising as low hills above a monotonous lowland, across which rivers flowed sluggishly toward the sea (Figure 3a). This lowland was then arched upward by forces within the Earth, and streams began downcutting with renewed vigor, dissecting the up-arched surface into many isolated remnants (Figure 3b). The maximum amount of upwarping was probably less than 6000 feet near the center of the present White Mountains, and decreased toward the present seacoast. The highest peaks of the White Mountains and central Maine and some of the hills nearer the coast of Maine are probably the stumps of the ancient mountains that were carried upward when the entire region was upwarped.

Probably no remnants of the upwarped surface remain on the mountain tops of New England (Figure 3c). However, if you drive any distance northwest of Sebago Lake toward the White Mountains, or southeast toward Portland, you will be aware that the altitudes of the highest summits decrease uniformly toward the southeast all the way from Mount Washington to the seacoast. This regional slope of summit altitudes is the only evidence that remains to suggest that a former plain-like lowland surface was arched upward and dissected by erosion.

The last million years of Earth history have been a time of mountain building and climatic change not typical of the long history of the Earth. The mountain ranges we see today have reached their present form in this last, relatively short, epoch of geologic time. One of the significant events of this last million-year interval, known as the Pleistocene epoch (Figure 2) was repeated expansion of continental-sized ice sheets thousands of feet thick over northern North America, Europe, and parts of the Southern Hemisphere. At least four times during the Pleistocene epoch, snow accumulated over regions in the higher latitudes, compacted, and flowed outward under its own weight as glacier ice, which spread over millions of square miles. As each ice sheet advanced, it scraped away soil and loose surface rocks, and using the broken pieces of rock as tools, ground and polished the underlying bedrock. When climatic conditions changed and the ice sheets disappeared, they left behind heaps of gravel and sand that can be used to interpret the history of ice retreat. Each cycle of glaciation may have lasted 70,000 years or more, and was separated from previous and successive glaciations by warmer interglacial intervals, during which the climate was at least as mild as present. The only large ice caps existing on Earth today cover Greenland and Antarctica,

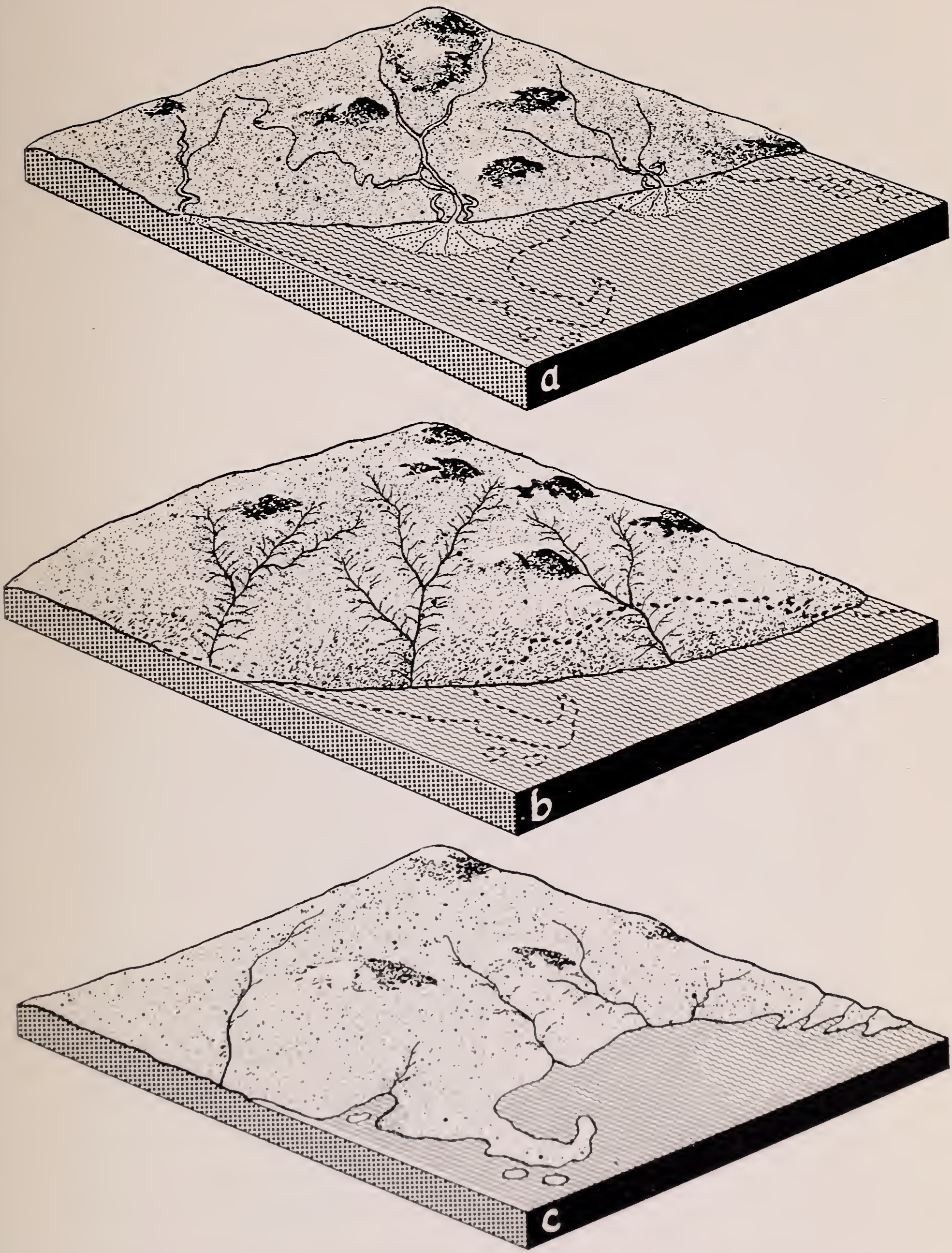


Figure 3. Hypothetical stages in the development of the New England Upland. a. During Cretaceous time, 70-130 million years ago. b. During early Cenozoic time, with upwarping and stream erosion in progress. c. Present configuration.

but there is no way of telling whether we now live in an interglacial time or whether the most recent glaciation was the final one. Although Maine was probably covered by all of the successive North American ice sheets, the only record that remains is of the last glaciation, which reached its maximum extent about 20,000 years ago.

At the beginning of the Pleistocene epoch, the region around Sebago Lake had once again been reduced by erosion to a series of worn-down, rounded hills and low mountains separated by the branching valleys of river systems. Successive glaciations scraped away all the deep soil, gouged and steepened the sides of valleys, dammed and diverted rivers, and added much to the scenic beauty of the region. But glacial erosion was more effective in adding detail than in altering the fundamental regional topography. Many hills around Sebago Lake, including the high hill on the west edge of the State Park, have steep slopes facing south and more gentle slopes facing north. This asymmetry may be the result of glacial erosion that ground smooth the northern slopes up which the ice moved, but plucked and quarried the southern slopes as the moving ice tended to pull away from them.

Can you imagine an ice sheet covering all of the land around you, sliding and grinding over the place you now stand? We know that Pleistocene glaciers were more than 5,000 feet thick over New England and passed over the highest mountains, for rock fragments not like the local bedrock have been collected from the tops of Mount Washington, Mount Katahdin and many other high peaks. These fragments of rock types foreign to an area are called erratics, and could have been carried up to their present location only by moving ice. You can find many glacial erratics in the loose gravel surface cover of Sebago Lake State Park. An example will be described subsequently.

The final movement of glacier ice over Sebago Lake State Park may have been as recent as 10,000-12,000 years ago. As the glacial climate moderated, the annual supply of new snow to centers of glacier accumulation decreased, and the loss of ice by melting and evaporation increased, until finally the ice margin ceased to expand and began to retreat. Movement of glacier ice outward from the center of the pile probably continued for a time even though the outer margin was retreating, but when the first high peaks of buried hills began to appear through the thinning ice, glacier movement must have ceased entirely. Many of the mountains near Sebago Lake State Park rise about one thousand feet above adjacent valley floors, so this measurement may be taken as a minimum thickness for moving glacier ice over this part of Maine.

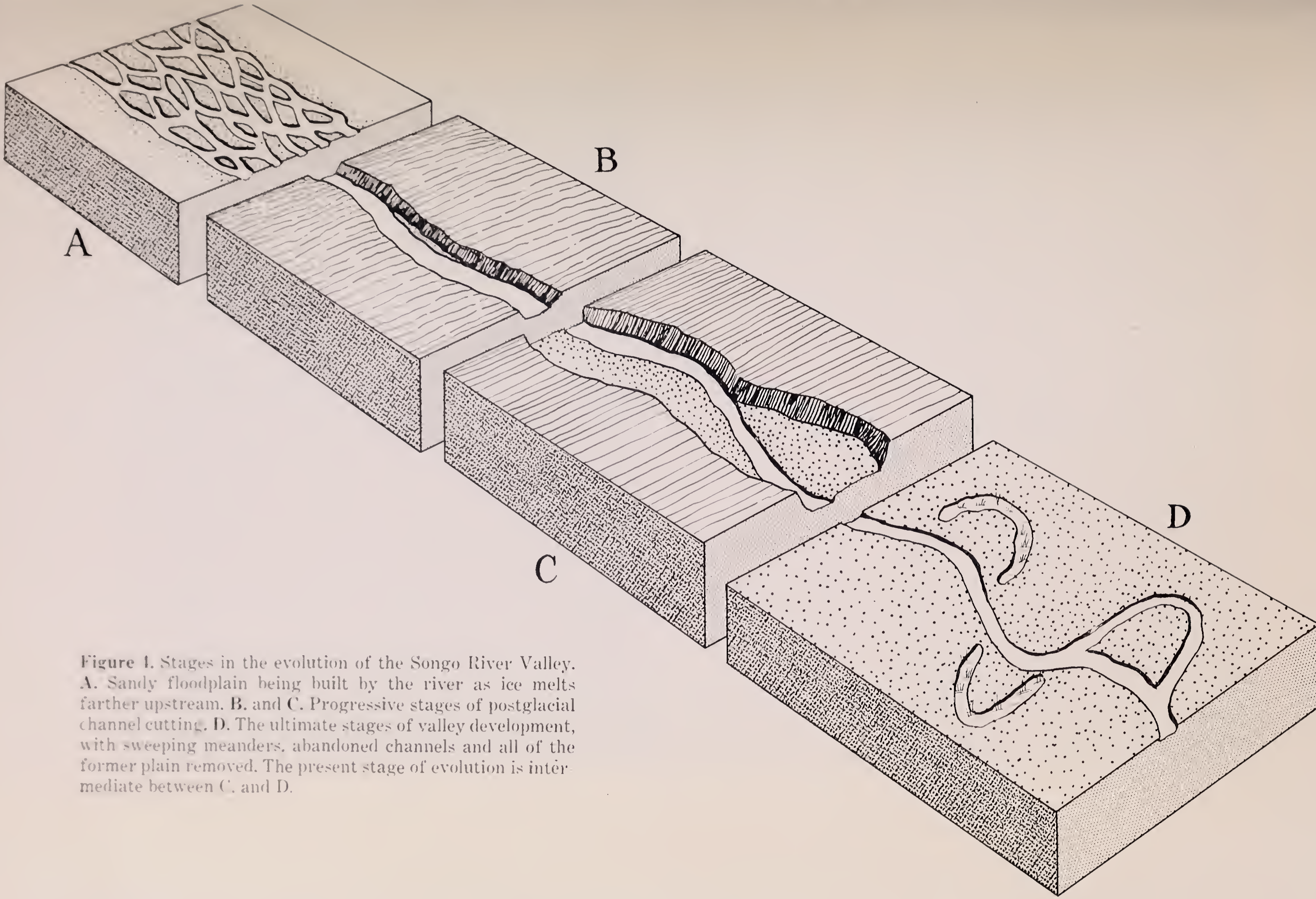


Figure 1. Stages in the evolution of the Songo River Valley. A. Sandy floodplain being built by the river as ice melts farther upstream. B. and C. Progressive stages of postglacial channel cutting. D. The ultimate stages of valley development, with sweeping meanders, abandoned channels and all of the former plain removed. The present stage of evolution is intermediate between C. and D.

The final ice to melt in the State Park area was a block a mile or more across that filled the floor of the present Songo River valley. This ice block melted away from the rock hills along the western edge of the State Park; and into the gap sand and gravel were dumped, carried there by streams of meltwater draining from the sediment-filled ice. A flat-topped terrace was built between the rock hills and the remnant ice block. Such ice-marginal features are called kame terraces; they are common throughout New England. The kame terrace in Sebago Lake State Park stands nearly 40 feet higher than the river valley floor that borders it on the east; the road to the Witch Cove camping area is on the surface of the kame terrace most of the length of the park (Figure 1 and plate III). The original width of the kame terrace cannot be determined, because later river erosion may have undercut its eastern edge and removed part of the terrace.

With the melting of the last block of ice on the valley floor, the western side of Sebago Lake State Park looked very much as it does today. The valley of the Songo River looked very different, however. The Crooked River, which joins the Songo River near the State Park entrance, drains a large area to the north, and apparently carried great quantities of sand-laden glacial meltwater away from ice melting farther north for a time after the State Park itself was ice-free. During this interval the river through the State Park was a braiding, shifting, shallow stream, full of sand bars, and subject to seasonal floods of icy water (Figure 4a). A wide river flood plain was formed through the State Park area by successive sheets of sand being deposited along the river course. Finally a sandy plain extended east across the valley floor from the foot of the kame terrace to rock hills on the east side of the valley, and continued north for many miles up the Crooked River valley. When the Crooked River drainage basin became entirely free of ice, the river no longer carried quantities of sand and was able to erode a channel into the sandy plain it had previously built. Instead of a braided, sand-choked stream, the Crooked River and its continuation as the lower Songo River flowed as clear water in a channel that was not constantly being shoaled. Small curves in the river course developed into sweeping meanders as the river cut away its banks (Figures 4b, c, and d).

The sand excavated by the river was carried to Sebago Lake and dropped at the river mouth, where currents slackened. A delta has now been built out over half a mile into Sebago Lake by the Songo River. Fishermen and boaters are aware of the shifting, shallow, sandy lake bottom near the river mouth. Currents and waves, generated by wind blowing across the lake surface, have moved some of the sand laterally along the lake shore away from the river mouth. The sandy beaches along the State Park waterfront are composed of sand carried to the lake by the Songo River. The processes of erosion and transportation of sand to the river mouth and subsequent distribution along the beaches of the State Park are continuing today.

Features of Geologic Interest in the State Park Area

The geologic history of Sebago Lake State Park as set forth here has been deciphered from evidence available for all to examine. A series of selected features will now be described in detail, so that visitors to the State Park area can see for themselves how Earth history is recorded in rock and landscape.

Bedrock Types

A good place to examine the bedrock of the State Park area is along the waterfront, at the floor of the rocky hill between Witch Cove Beach and Naples Beach. At the west end of Naples Beach, below the pump house, is an exposure of bedrock (Figure 5) that may have been

Figure 5. Granite streaked with pegmatite layers, exposed at the west end of Naples Beach.

ground smooth by glacial erosion but is now pitted by weathering. Notice the bands of pegmatite streaking the rock surface in wavy patterns. Even without a magnifying glass, you will be able to see how the mineral grains in the coarse pegmatite veins form an interlocking network.

The colorless or gray, glassy-looking mineral in pegmatite and granite is quartz. The pink mineral is feldspar; it breaks along flat planes that reflect light like little mirrors. The third common mineral in granite and pegmatite is mica, which splits easily into thin sheets that may be black or transparent. In addition to these three common minerals, the granite and pegmatite contain much garnet, in the form of sand-size, pink or red glassy grains. In a few places you may be able to find garnets as large as a fingertip, but they will shatter and crumble if an attempt is made to remove them from the rock.

At the West end of Witch Cove Beach a dike of dark igneous rock cuts the granite. The edges of the dike are nearly vertical (Figure 6) and the dike is about 20 feet thick. Examine the margins of the dike where it is in contact with granite. These margins are finer-grained than the central part of the dike. We say that the margins are chilled, because the molten rock cooled more quickly in contact with the granite than in the interior of the dike, and crystals did not have time to

Figure 6. Dike rock (left) cutting through granite (right) at the east end of Witch Cove Beach. The hammer handle crosses the contact between the contrasting rock types.

form. Notice how sharply the dike cuts across pegmatite veins in the granite. We know the dike is younger than the granite and pegmatite because of this cross-cutting relationship. You can find many other examples of dikes cutting granite in the State Park area. Some dikes are only a few inches wide, but they always cut sharply across the "grain" of the granite and pegmatite.

A Glacial Erratic

Drive or walk to the large gravel pit near the entrance to the State Park campground, at the Thompson Point Road fork. Standing in the center of the floor of this pit is a large boulder of dark gray rock streaked with veins of white quartz (Figure 7). The boulder, measur-

Figure 7. A large glacial erratic. This huge stone, estimated to weigh at least 27 tons, was carried to the Sebago Lake State Park area from an unknown place of origin. It is unlike the local bedrock, hence the name, "erratic."

ing about 5x10x12 feet and estimated to weigh at least 27 tons, was uncovered by the removal of sand and gravel from the pit. The boulder is of a metamorphic rock type called argillite, but no large masses of argillite are known in the bedrock of the State Park area. Therefore this great block is probably a glacial erratic, or foreign stone. We do not know its place of origin, but it presumably came from the northwest, the direction from which the last glacier moved over this part of Maine. A search of any exposure of loose gravel or any rock pile in the State Park will reveal many other smaller erratics.

Till

The sediment abandoned by melting glacier ice is called drift; it includes material deposited directly from the ice and material washed out of the ice and deposited by meltwater streams. Till is the name given to glacial drift that was deposited directly from ice without being washed by running water.

Till is widespread over the rock hills of the State Park area, but it is patchy and thin, and not well exposed. A good exposure of till may be seen in the trail up to the State Park reservoir, across the campground road from the theatre parking lot. As you climb the trail to the reservoir, notice the variety of rock types underfoot. You should be able to identify many pieces of the local granite, pegmatite and dolerite, but you will find many erratics too. Notice also the wide range in size of the rock fragments in the till. Large boulders, pebbles, sand, and fine clay-size particles are all mixed together. The outstanding characteristic of till is lack of sorting by size. It is not the type of deposit formed by a river, which sorts its load according to size and leaves boulders and gravel in its mountain headwaters, sand in its central portion and mud at its mouth.

Till also contains stones with flattened surfaces, or facets, and some of the stones are marked with the distinctive scratches (striations) and grooves (Figure 8) that are also found on some glaciated bedrock surfaces. Some of these stones may have been the tools that gouged into the rock floor beneath the glacier. As they were pushed over the underlying rock, or against each other, the stones were ground flat, then turned and beveled at another angle. The lack of sorting and the shape of the stones in till are two kinds of evidence that indicate till is a form of glacial drift that was deposited directly by melting ice without subsequent transportation by running water. Less than 10% of the stones in most till deposits are faceted and striated, so be patient if you wish to find an example on the trail to the reservoir. Granite and pegmatite stones are too coarse-grained to be susceptible to faceting; they were more often broken into sharp fragments or crushed to sand by glacial action. Look for fine grained, dark rocks as the most likely to be faceted and striated.

Figure 8. A faceted and striated cobble from till. This stone, like others found in till, has surfaces that were flattened and scratched by grinding against other stones beneath glacier ice.

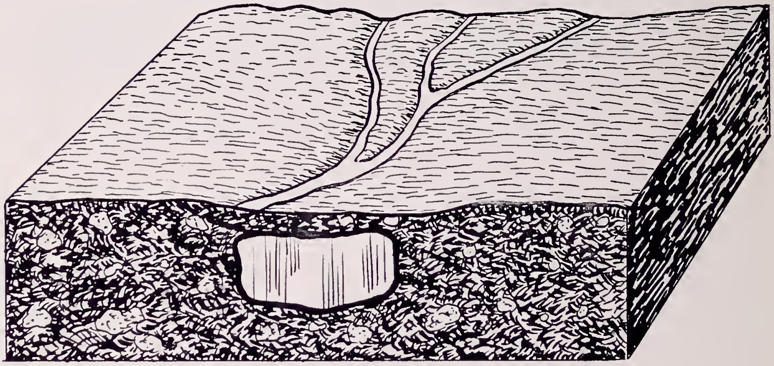
A Glacial Kettle Hole

Walk east on the road from Naples Beach campground through the old entrance gate and past the ranger's cabin. As you walk up the road, you will be on the kame terrace that fringes the hills on the west side of the State Park. On the north edge of the road, about 500 feet east of the ranger's cabin, you will notice a large, basin-shaped hole in the ground, grown full of trees. This hole, or kettle, is about 200 feet across at the top, nearly circular, and about 30 feet deep. It has no valley entering or leaving it, so it could not have been cut by running water. The grass-and tree-covered sides of the kettle slope inward at an angle of about 25 degrees, approximately the angle of slope at which a bank of loose sand and gravel will cease to slide.

This kettle formed during the building of the kame terrace along the west side of the valley. A block of melting ice, approximately the size of the kettle, was buried here in sand and gravel that washed into a gap between till-strewn rocky hills on the west and the melting ice that filled the center of the valley. Protected and insulated by its cover, the buried ice block melted slowly, as more sand and gravel were washed over it. After the kame terrace had been built, the ice block completely melted, and the overlying layers of sediment collapsed into the hole, leaving a neat, round kettle (Figure 9).

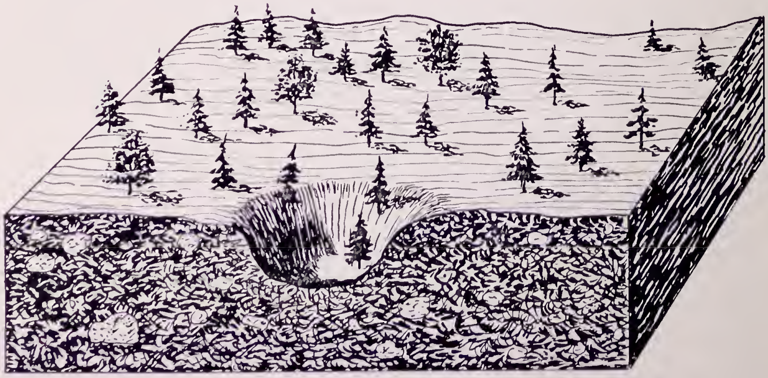
(A)

a. A block of melting ice partly buried by river sand and gravel.



(B)

b. The block is completely buried but glacially-derived sand and gravel continue to spread over the site.



(C)

c. After deposition has ceased the buried ice block has melted, permitting the overlying layers to collapse into the opening.

Figure 9. Stages in the formation of a glacial kettle.

Many of the smaller lakes in Maine are kettle lakes, formed as outlined above but now filled with water. Many kettle lakes have neither inlet nor outlet but are fed by springs, and drain by seepage through permeable gravel beds. Sebago Lake is not a kettle lake, but owes its origin in part to a dam of glacial drift that fills a preglacial outlet near Sebago Lake Station at the south end of Lower Bay. The Otter Ponds, which lie on both sides of the Maine Central Railroad tracks half a mile east of Sebago Lake Station, are kettle lakes in this dam of drift (Figure 10). They are 15-20 feet lower than Sebago Lake, and are fed from it by seepage.

Figure 10. One of the Otter Ponds south of the Maine Central Railroad tracks near Sebago Lake Station. A kettle hole pond in the dam of glacial drift at the south end of Sebago Lake.

The Songo River Valley

The Songo River valley in the State Park area has a two-chapter history, as outlined previously. During deglaciation it received quantities of stream-transported sand, and the valley floor was a flat, sandy flood plain over which the river spread in shallow, shifting, "braided" channels. Later, in postglacial time the river began to cut into the sandy valley floor and changed from a braiding to a meandering habit. The evidence for such a history is presented below.

As you drive toward Songo Beach from the checking station, you are on the surface of the old flood plain. Notice how flat the ground is on both sides of the road. Stop at the first place the Songo River swings near the Songo Beach Road, and look at the sandy river bank. Notice first that the river is actually increasing its sharpness of curvature by undercutting the bank at your feet and migrating away from the low slope on the opposite side. By this manner, the river forms great loops that are eventually cut through at a narrow place and become abandoned. The swamps along the Songo River are a series of such former channels.

Notice also the height of the river bank at your feet. The present surface of the Songo River is very nearly at lake level. The old flood-plain surface here, at the north end of the State Park, is at least 15 feet above river level. As you drive south toward the beach, you will see that the flood-plain surface slopes downward, and is about 5 feet above river level at the boat launching ramp, and only about 2 feet above river level at the Songo Beach parking area. The flood-plain surface has a southward slope through the State Park of about 10 feet per mile. Such a slope may seem gentle, but it is steep compared to the very slight grade of the present river. At the time the flood plain was being built, the river required this steep downstream slope in order to move its load of sand.

If you have a small shovel or other digging tool, climb part way down one of the river banks and scrape the loose sand away so that you can examine the original layering, or stratification, in the sand that forms the flood plain (Figure 11). Notice how the sand forms layers a few feet long that slope in many directions and end abruptly against each other. This kind of stratification is typical of sand deposited in bars in a shallow, shifting river channel.

Examine a handful of the sand from the river bank. It is composed of quartz, feldspar and mica, as is the granite and pegmatite from which it was derived. Notice the uniform size of the sand grains; no gravel or large stones are present. Notice also the angularity of the sand. If sand is carried a long way in a river the grains are worn smooth and round. Thus we know that this sand has not traveled a great distance.

Here is the evidence for the history of the Songo River Valley: (1) sharp, angular sand derived from a granite source but not carried more than a few tens of miles, (2) a river flood plain built of this sand, having a steep downstream slope and (3) the present river not

Figure 11. Stratified sand of the former Songo River flood plain, exposed in the banks of the present river. The layers of sand are characteristic of deposits made by streams.

building, but eroding the older deposit, flowing slowly and meandering from valley side to valley side. Do you see how the history of a river valley can be learned by interpreting such evidence?

Beaches

Having examined the sand in the banks of the Songo River, you will have no difficulty in recognizing the origin of the sand on the beaches of Sebago Lake State Park. The mineral composition and the size and angularity of the sand on the beaches show that it has been derived from the river banks. Many people comment that the beach sand in the park feels sharper, because the beach sand in the State Park is subject to less stirring and abrasion by wave action than ocean-beach sand.

A sandy delta has been built nearly half a mile into Sebago Lake at the mouth of the Songo River. The delta represents the sand removed from the old flood plain since the river began to excavate its meandering channel. But how does sand carried to the lake at the

Plate I — Figure A. The east bank of the Songo River showing the undercutting of the old flood plain by the present day river.

Plate I — Figure B. Park road to the campground.

river mouth become spread along the two-mile State Park waterfront? An observation of shoreline activity in the lake will answer that question.

On a day when the wind is causing waves to strike the beach at an angle, float a chip of wood near the waterline and watch the path of the chip as it is carried by the waves. As each wave breaks, the chip is carried toward the high water line, but not straight up the beach. It is also carried laterally a few inches, depending on the direction and force of the wind-driven waves. As the wave withdraws, the chip is carried back down the beach. Thus the chip follows a saw-toothed path, angling up the beach on the crest of each wave, then sliding straight back down. Now dig a small hole at the waterline and watch the movement of the sand grains that fill it. You will see the same pattern followed by the chip of wood. Each grain of sand carried by the waves . . . and there is enough sand in a cupful of turbulent shallow water to cover the bottom of the cup . . . follows the path of the chip, migrating up and down on the beach but also moving laterally downwind. This is the process by which sand is constantly spread from the river mouth to the State Park beaches. The sand never stops migrating; the process of nourishing the beaches is probably as active today as it has been in the past. Under the influence of winds blowing up the lake from the southwest, Songo Beach receives new sand; if the wind is from the southeast, Naples Beach and Witch Cove Beach are supplied.

As the river sand is moved along the beaches, it becomes better sorted. Small flakes of mica, being very flat, are kept in suspension longer by wave action and collect in sheltered places on the bottom. Garnet, the dark pink or red mineral that is scattered in small grains through granite, is slightly heavier than the other minerals in the sand, and is abandoned near the waterline as the lighter-colored and lighter-weight grains move on. It is possible to skim a layer of pure red garnet sand nearly an inch thick from some parts of the beaches in the State Park. Unfortunately, garnet sand has only minor commercial value as a non-skid deck and floor surfacing. A hole dug nearly anywhere in moist beach sand will show alternating layers of red garnet sand, black mica, and white or pale pink quartz and feldspar sand, illustrating the variable competence of the lake waves in storm and calm conditions.

Plate II — Figure A. Beach at Thompson Point and Naples Beach.

Plate II — Figure B. Shore of Lower Bay at the south end of Sebago Lake.

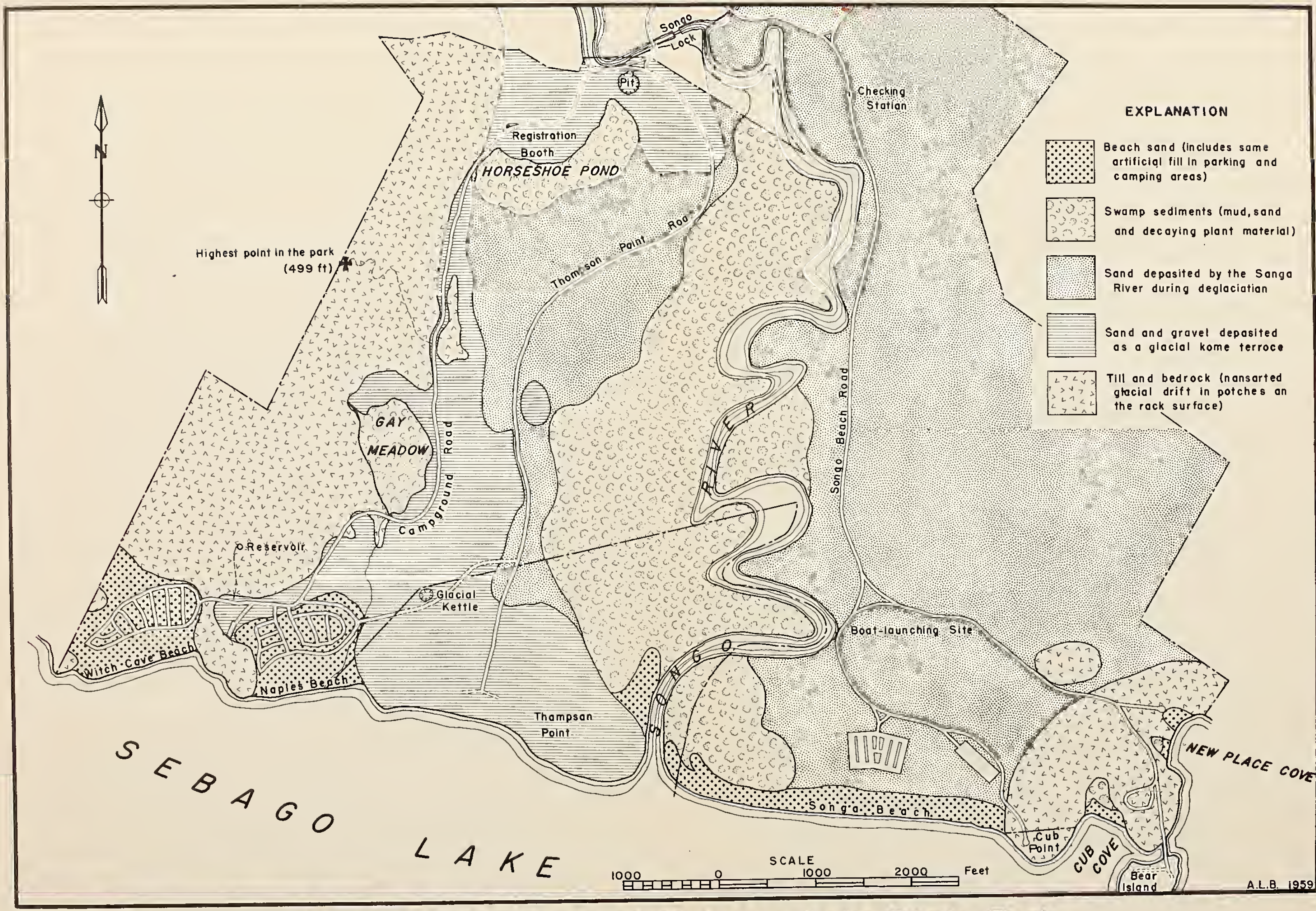


Plate III Geology of Sebago Lake State Park